Amendments to the Claims:

The following listing of claims will replace all prior versions, and listings, of claims in the application:

1. (Original) An apparatus for determining movement, comprising

means for generating at least two signals of different phase in dependence on the relative position of two objects, movement of said two objects causing corresponding changes in said at least two signals; and

a processor for processing said at least two signals, thereby to determine said movement, the processing by said processor being on the basis of locating the constellation states of successive values of the at least two signals in at least one co-ordinate axis system, said at least one co-ordinate axis system defining at least six separate segments rotationally displaced, and said processor is arranged to monitor the change in said constellation states of the successive values by using at least two processed data samples, said successive samples being obtained by sampling said at least two signals at a predetermined clock rate.

2. (Original) An apparatus according to claim 1, wherein said at least one co-ordinate axes system comprises first and second co-ordinate axes systems each with a plurality of axes defining at least three segments, the axes of the second co-ordinate axis system being rotationally displaced relative to the axes of the first co-ordinate axis system.

3. (Original) An apparatus according to claim 2, wherein prior to sampling a processed data sample, one of the coordinate axis systems is rotated relative to the previous data sample such that the angular position of the previous data sample with respect to this rotated co-ordinate axis system is known.

4. (Original) An apparatus according to claim 1, wherein said processor is arranged to derive a prediction of one of said successive values of said constellation states from at least two of said successive values of said constellation states preceding said one

value, and to compare said prediction with the corresponding location of said one successive value.

5. (Original) An apparatus according to claim 4, wherein said prediction is derived on the basis of a predetermined constraint on permitted variations in said successive values.

6. (Original) An apparatus according to claim 5, wherein said predetermined constraint is a maximum permitted change in velocity.

7. (Original) An apparatus according to claim 5, wherein said predetermined constraint is a maximum permitted charge in acceleration.

8. (Original) An apparatus according to claim 1, wherein the processor is arranged to determine the separations of each successive value from two adjacent axes of said at least one co-ordinate axis systems.

9. (Original) An apparatus according to claim 8, wherein said processor is further arranged to determine the ratio of said separations.

10. (Original) An apparatus according to claim 1, wherein each of said successive samples are obtained by sampling said at least two signals at a predetermined interval.

11. (Original) An apparatus according to claim 1, wherein each of said successive samples is obtained from a plurality of values of said at least two signals.

12. (Original) An apparatus for determining movement, comprising means for generating at least two signals of different phase in dependence on the relative position of two objects, movement of said two objects causing corresponding changes in said at least two signals; and a processor for processing said at least two signals, thereby to determine said movement the processing by said processor is on the basis of locating the constellation states of successive values of the at least two signals in at least first and second coordinate axis systems, said at least first and second co-ordinate axis systems each defining at least three

separate segments rotationally displaced, and said processor is arranged to monitor the change in said constellation states of the successive values by using at least two processed data samples, said successive samples being obtained by sampling said at least two signals at a predetermined clock rate.

13. (Original) An apparatus according to claim 12, wherein each of said first and second co-ordinate axis systems has a plurality of axes defining said at least three segments, and the axes of said first one of said co-ordinate axis systems are rotationally displaced relative to the axes of the said second of said co-ordinate axis systems.

14. (Original) An apparatus according to claim 12, wherein each of said first and second co-ordinate axis systems has a plurality of axes defining said at least three segments, and at least one axis of each of said first and second co-ordinated axis systems are coincident.

15. (Original) An apparatus according to claim 12, wherein said first and second co-ordinate axis systems having the same number of axes.

16. (Original) An apparatus according to claim 12, wherein said first and second co-ordinate axis systems have different numbers of axes.

17. (Original) An apparatus according to claim 12, wherein prior to sampling a processed data sample, one of the co-ordinate axis systems is rotated relative to the previous data sample such that the angular position of the previous data sample with respect to this rotated co-ordinate axis system is known.

18. (Original) An apparatus according to claim 12, wherein said processor is arranged to derive a prediction of one of said successive values of said constellation states from at least two of said successive values of said constellation states preceding said one value, and to compare said prediction with the corresponding location of said one successive value.

19. (Original) An apparatus according to claim 12, wherein said prediction is derived on the basis of a predetermined constraint on permitted variations in said successive values.

20. (Original) An apparatus according to claim 19, wherein said predetermined constraint is a maximum permitted change in velocity.

21. (Original) An apparatus according to claim 19, wherein said predetermined constraint is a maximum permitted charge in acceleration.

22. (Original) An apparatus according to claim 12, wherein the processor is arranged to determine the separations of each successive value from two adjacent axes of said at least one co-ordinate axis systems.

23. (Original) An apparatus according to claim 22, wherein said processor is further arranged to determine the ratio of said separations.

24. (Original) An apparatus according to claim 12, wherein each of said successive samples are obtained by sampling said at least two signals at a predetermined interval.

25. (Original) An apparatus according to claim 12, wherein each of said successive samples is obtained from a plurality of values of said at least two signals.

26. (Original) An apparatus for determining movement, comprising:

means for generating at least two signals of different phase in dependence on the relative position of two objects, movement of said two objects causing corresponding changes in said at least two signals;

a processor for processing said at least two signals, thereby to determine said movement; and

means for filtering over a frequency band which is narrow relative to the maximum bandwidth of said signals, said filtering means including means for varying the

central frequency of said band over said maximum bandwidth, in dependence on a value derived from at least two data samples processed by said processor.

27. (Original) An apparatus according to claim 26, wherein said derived value is a prediction determined from said at least two data samples and a velocity requirement of said movement.

28. (Original) An apparatus according to claim 27, wherein the processing by said processor is on the basis of locating the constellation states of successive values of the at least two signals in at least one co-ordinate axis system said processor is arranged to derive said prediction, being a prediction of one of said successive values of said constellation states, from at least two of said successive values of said constellation states preceding said one value.

29. (Original) An apparatus according to claim 26, wherein said filtering means has means for varying the frequency width of said bandwidth in dependence on an acceleration measurement determined from said signals by said processor.

30. (Original) An apparatus according to claim 26, wherein said filtering means is arranged to filter said signals in analogue form.

31. (Original) An apparatus according to claim 26, wherein said filtering means is arranged to filter said signals in digital form.

32. (Original) A method of determining movement, comprising generating at least two signals of different phase in dependence on the relative position of two objects, movement of said two objects causing corresponding changes in said at least two signals; and processing said at least two signals, thereby to determine said movement, being on the basis of locating the constellation states of successive values of the at least two signals in at least one co-ordinate axis system, said at least one co-ordinate axis system defining at least six separate segments rotationally displaced, and said processing includes monitoring the change

in said constellation states of the successive values by using at least two processed data samples, said successive samples being obtained by sampling said at least two signals at a predetermined clock rate.

33. (Original) A method of determining movement, comprising generating at least two signals of different phase in dependence on the relative position of two objects, movement of said two objects causing corresponding changes in said at least two signals; and processing said at least two signals, thereby to determine said movement, the processing being on the basis of locating the constellation states of successive values of the at least two signals in at least first and second co-ordinate axis systems, said at least first and second co-ordinate axis systems each defining at least three separate segments rotationally displaced, and said processing includes monitoring the change in said constellation states of the successive values by using at least two processed data samples, said successive samples being obtained by sampling said at least two signals at a predetermined clock rate.

34. (Original) A method for determining movement, comprising:

generating at least two signals of different phase in dependence on the relative position of two objects, movement of said two objects causing corresponding changes in said at least two signals; and processing said at least two signals, thereby to determine said movement; and

filtering over a frequency band which is narrow relative to the maximum bandwidth of said signals, said filtering includes varying the central frequency of said band over said maximum bandwidth, in dependence on a value derived from at least two data samples processed from said signals.

35. (Original) An apparatus for determining movement, comprising:

means for generating two signals of different phase in dependence on the relative position of two objects, the movement of said two objects producing corresponding changes in said two signals;

a processor for processing said two signals, thereby to determine said movement whereby the means for processing is on the basis of locating successive values of constellation states of the two signals in a first co-ordinate axis system comprising an axis radiating from an origin, said processing means being arranged to monitor the change in said constellation states of the successive values by using at least a first and a second data samples which are obtained by sampling the two signals over time;

wherein a second co-ordinate axis system comprising an axis radiating from an origin is provided whereby the second co-ordinate axis system is rotatable and prior to sampling the second data sample the second co-ordinate axis system is relative to the first data sample such that the angular position of the first data sample with respect to the second co-ordinate axis system is known.

36. (Original) An apparatus according to claim 35 wherein the rotatable co-ordinate axis system is rotated such that the first data sample is substantially aligned to the axis of the rotatable axis system.

37. (Original) An apparatus according to claim 36, wherein said prediction is derived on the basis of a predetermined constraint on permitted variations in said successive values.

38. (Original) An apparatus according to claim 35 wherein the rotatable co-ordinate axis system comprises two further axes which define the forbidden zone.

39. (Currently Amended) An apparatus according to ~~any of claims~~claim 35 wherein the change in the constellation states that is monitored is one of change in displacement, velocity or acceleration.

40. (Original) An apparatus according to claim 35 wherein the processor is arranged to derive a prediction of a successive value of the constellation of states from a previous value of the constellation states, and to compare the prediction with the corresponding location of the successive value.

41. (Original) An apparatus according to claim 35 wherein the processor is arranged to derive a prediction of a successive value of the constellation of states from at least two previous values of the constellation states, and to compare the prediction with the corresponding location of the successive value.

42. (Original) An apparatus according to claim 40 wherein the prediction is derived on the basis of a predetermined constraint on permitted variations in the successive values.

43. (Original) An apparatus according to claim 42 wherein the predetermined constraint is velocity, acceleration or a higher order derivative.

44. (Original) A method of determining movement, comprising

generating at least two signals of different phase in dependence on the relative position of two objects whereby movement of the two objects causes corresponding changes in the at least two signals;

sampling the at least two signals to obtain a data sample;

processing the data sample, on the basis of locating the constellation states of the at least two signals in a first relatively fixed co-ordinate axis system which comprises an axis radiating from an origin,

rotating a second rotatable co-ordinate axis system with respect to the first co-ordinate axis system and the processed data sample such that the angular position of the data sample with respect to the second rotatable co-ordinate axis system is known wherein the second rotatable co-ordinate axis system comprises an axis radiating from an origin; and

sampling the at least two signals to obtain a further data sample.

45. (Currently Amended) A method according to claim ~~42~~ 44 wherein the second rotatable co-ordinate axis system defines a movable angular region of uncertainty whereby, if the further data sample lies within this region, an error is flagged.